INDUSTRIAL DIAMOND ABSTRACTS

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MAY

DIAMOND MINING AND INDUSTRY

Alluvial diamond production

S Africa Dept Mines. *Diamond News* etc 1958 Vol 21 (5) pp 31-32 (Feb) ; (6) p 34 (Mar)

Rough and uncut diamond production in November 1957 for Transvaal Province : 8,141.75 ct of total value £31,405 (77s 2d per ct). Cape Province and Private Estates : 8,124.25 ct of total value £77,941 (192s 2d per ct). Thus total production amounted to : 16,266 ct of total value £109,346 (134s 6d per ct).

Production in December 1957 for Cape Province : 3,339 ct of total value £31,510 (188s 9d per ct). Private Estates : 417.75 ct of total value £7,665 (366s 11d per ct). Transvaal Province : 8,443.25 ct of total value £27,631 (65s 6d per ct). Thus total production amounted to : 12,200 ct of total value £66,806 (106s 9d per ct).

See also *Ind Diamond Abstr* 1958 Vol 15 p A53 (Apr).

M *C 1.21*

Siberian diamonds

Anon. *Mining Journ* 1958 Vol 250 (6394) p 274 (Mar 7)

Refers to Russian claims that large numbers of Kimberlite pipes, etc, have been discovered in the south eastern part of Yakutia. This is believed to indicate a considerably wider distribution of diamond bearing ground over the whole of the Siberian layer.

G *C 1.24*

Tanganyika mineral exports

Anon. *SA Mining & Engg Journ* 1958 Vol 69 Pt 1 (3396) p 435 (Mar 14)

Tanganyika exports of diamonds for January 1958 were of 45,241 carats, valued at £377,000, compared to a total of 1,848 carats, valued at £18,158, for January 1957. 1 table. *A* *C 1.22*

Premier mine developments marked improvement on mining methods of a few generations ago

Anon. *Diamond News* etc 1958 Vol 21 (6) pp 23-26 (Mar)

A description of the mine includes information on the geological formation and treatment plant. 1 illustr.

W *C 1.21*

The mineral prospects of the Sahara

Anon. *SA Mining & Engg Journ* 1958 Vol 69 Pt 1 (3397) pp 477, 479, 481 (Mar 21)

The review mentions the prospect of a source of diamonds being discovered. One area has yielded six diamonds, and it is suggested that they could indicate a placer in the area. Five of the diamonds were small, but of a ' beautiful bluish water '. The sixth and largest was an industrial ' carbonado '.

W *C 1.24*

Mining in Tanganyika : Diamonds

Anon. *SA Mining & Engg Journ* 1958 Vol 69 Pt 1 (3396) pp 431, 433 (Mar 14)

At Williamson Diamonds and Alamasi much building and general improvement work is in progress. Production of rough diamonds exceeded that for 1956, and exports showed an increase of approximately 4% by weight and 1½% by value.

A *C 1.22*

The diamond industry in the Belgian Congo

Anon. *Mining Journ* 1958 Vol 250 (6394) pp 267-268 (Mar 7)

Review of ' L'industrie du diamant en 1956 ', by M. A. Moyar. See *Ind Diamond Abstr* 1958 Vol 15 p A53 (Apr).

G *C 1.22*

The mines and minerals of South Africa. Suedafrikas Bergbau und mineralische Rohstoffbasis

F. Schmidt. *Umschau* 1958 Vol 58 (4) pp 97-100 (Feb 15) (In German)

This survey of the raw material resources of South Africa includes a paragraph on the location and output of diamond mines. 6 illustr, 1 table.

H *C 1.21*

The diamonds of Yakutia. Die jakutischen Diamanten

M. S. Srjakowski, N. N. Makarow. *Sowjet Buchneuerschein* 1958 (2) p 24 (Mar 1) (Original in Russian)

Book, Geografigis. 1958, 96 pp. Price DM -.90.

The discovery of the diamond deposits in Yakutia is described in popular terms. [Not in library of Ind Diamond Inf Bur].

H *C 1.24*

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Diamonds by the pound

Gen Electr Co. *Wire & Wire Prod* 1958 Vol 53 (2) pp 190-191 (Feb)

Claims of past and future production of artificial diamonds were made at a press conference held by GEC. 100,000 carats of artificial diamonds had already been made, and it was hoped to step up the production considerably in the near future. It was expected that with the increase in production, a decrease in price would be possible. 1 illustr. *G* *C 2.6*

PHYSICAL, CHEMICAL, & MECHANICAL PROPERTIES OF DIAMOND AND OTHER HARD MATERIALS

New alumina-type cermets

T. F. Frangos (Haynes Stellite Co, Div of Union Carbide Corp). *Materials in Design Engg* 1958 Vol 47 (2) pp 112-115 (Feb)

The production and properties of alumina-based cermets are described, with information on the criteria for designing parts made of these materials. A brief note on machining and finishing is given. 7 illustr, 2 tables. *G* *C 8.7 : C 12.6*

X-ray study of laboratory-made diamonds

H. J. Grenville-Wells, K. Lonsdale. *Nature* (London) 1958 Vol 181 (4611) pp 758-759 (Mar 15)

The authors report the results of tests made on a number of the GEC synthetic diamonds. Both x-ray and spectroscopic tests show the presence of a considerable amount (0.2%) of nickel, together with smaller quantities of other elements. A suggested explanation is that nickel is used to induce the crystallization of carbon in the form of diamond. A further account of this work is to be published later. 2 illustr, 3 ref.
G *C 2.4 : C 2.6*

Some optical and stress-optical properties of synthetic ruby

J. A. Mandarino. (University of Michigan) (TS753,R8 M 31s Over) 1957 111 pp; *Battelle Techn Rev—Abstr* 1958 Vol 7 (3) p 225a (Mar) (No 4493)

Pleochroism, which is easily measured and requires only simple, inexpensive equipment, is applied to determination of trace elements.
X *C 2.26*

The electric furnace — creative inferno

N. H. Keyser. *Battelle Techn Rev* 1958 Vol 7 (3) pp 3-7 (Mar)

The author reviews the uses of electric furnaces in the metallurgical and chemical industries, and suggests areas where they could be used effectively in the future. Reference is made to the production of man-made diamonds from 100 μ to 1 mm on an edge, which have been produced in chambers heated above 3,500 deg F under pressures up to 1,500,000 lb/sq in. 3 illustr.
W *C 2.6*

Diamonds, natural or synthetic. Diamanten, echt oder synthetisch

K. Schlossmacher. *Dtsch Uhrmacher Zeits* 1958 Vol 62 (3) p 110 (Mar) (In German)

See *Ind Diamond Abstr* 1958 Vol 15 p A55 (Apr).
H *C 2.6 : C 2.61*

Determination of residual stresses in titanium carbide-base cermets by high-temperature x-ray diffraction

H. W. Newkirk, H. H. Sisler. *Ceram Abstr* 1958 Vol 41 (3) pp 93-103 (Mar 1)

A report on experimental work into the reasons for poor impact strength and brittleness of titanium carbide base cermets, leading to the conclusion that the great difference (2 : 1) in the thermal expansion coefficients of the nickel phase and the titanium carbide phase in these cermets is the cause of the brittleness. 16 illustr, 12 tables, 41 ref.
G *C 2.4 : C 8.72*

Metallurgical aspects of semi-conductors

J. Pratt. *Metal Industry* 1958 Vol 92 (15) pp 287-289 (Apr 11)

Papers on the metallurgy of semiconductors are summarized. The need for very pure materials in semiconductors is explained, and the techniques for obtaining them described. The preparation of pure compounds is studied. The effects of dislocation, *ie* of imperfections in the lattice structure, and the means of detecting and studying these by precipitation on them are explained. Suggestions for future lines of research and possible applications are given.
F *C 2.25 : C 2.51 : D 14.5*

Use of modern materials based on carbon and graphite

I. V. Temkin. *Vestnik Mash* 1958 Vol 38 (1) p 37; *DSIR Transl Contents Lists Russ Period* 1958 (109) p 133 (Apr) (Original in Russian)
X *C 12.0*

An improved orientation stage for microscopic optical crystallography

H. C. G. Vincent (Cape Town Univ). *Nature* (London) 1958 Vol 181 (4610) p 693 (Mar 8)

Describes improvements made to an accessory to the polarizing microscope to enable a full range of qualitative studies, quantitative measurements, and refractive index determinations to be carried out simply and accurately on a number of crystalline materials, without the need for corrections for the refraction of the glass sphere in which the specimen is mounted. 2 ref. *G* *C 2.5 : D 15.2*

DIAMOND IN INSTRUMENTS, ETC

Experiments within a diamond

US Nat Bur Standards. *Compr Air Mag* 1958 Vol 63 (2) p 33 (Feb)

A 7½ ct diamond, originally emerald shaped, was flattened on two sides and the bottom. A hole, 0.015 in. in diameter, was drilled lengthwise through the diamond, and minute pistons of hard tool steel were inserted from each end. This device serves as a pressure chamber, and the material to be tested is enclosed by the two pistons. The whole assembly can be placed in a hydraulic press and surrounded by an induction heating coil. Owing to the small dimensions of the cell, a weight of 80 lb produces an internal pressure of 450,000 lb/sq in. Changes in the specimen can be observed through the sides of the chamber by means of infra-red rays. *W* *D 5.0*

LITERATURE REQUESTS

Please quote the page number of the journal which contains the original reference, and the author and title of the article, in all cases.

HARDNESS AND WEAR TESTING

A survey of abrasion resistance tests for vitreous enamels

J. A. Clarke. *Met Finish Journ* 1957 Vol 3 (34) pp 408-412, 426 (Oct)

Paper to the Annl Conf of the Inst of Vitreous Enamellers, Chester, Oct 3-4, 1957.

Wear and scratch resistance tests are described with particular emphasis on those scratch tests in which a diamond is used for making the scratch. The shape and alignment of the diamond were found to be very critical, but it was found that, regardless of the shape or alignment of the diamond used, all diamonds placed specimens in the same order, although the loads required by different diamonds for the same enamel varied. It is suggested that Morriss's formula :

$$\text{Scratch load} = \frac{\text{load required to scratch test plate}}{\text{load required to scratch standard}}$$

overcomes the main objection to diamond scratch testing. It has been claimed that the formula produces an accuracy within 5%.

The American PEI test is discussed. There is evidence that good correlation has been obtained between results from the PEI tester and those from a diamond scratch instrument. It is concluded that it may ultimately be worth while developing a further diamond scratch apparatus, even if the diamonds have to be specially prepared and standardized.

In the discussion, Dr. B. K. Niklewski reported that a sub-committee which was studying the scratch and abrasion problem did not feel able to put forward tests developed on the basis of the diamond test. 3 ref.

W *C 4.3*

Micro-hardness testing. A review of practical experience and a suggested testing procedure

R. Wall (Assoc Automation Ltd). *Sheet Met Ind* 1958 Vol 35 (369) pp 61-62 (Jan)

In microhardness testing, the scatter is much greater than in ordinary hardness testing, although the latter can show a scatter of 200 VPN in the 700-900 VPN range. Macrohardness testing machines are unsuitable for testing very thin materials, *eg* 0.0005 in. thick metal foil, fine wire, electrodeposits, etc. The microhardness tester should be used, and its components are described in detail. They include a Vickers-type diamond indenter of 136° included angle, and a British Standard table of hardness numbers from which ocular measurement of the diamond impression will evaluate a hardness number dependent on the applied load at the diamond point. In addition to the square diamond pyramid with 136° angle between opposite faces, the Knoop diamond indenter can be used. This is an elongated pyramid, the angles between the long and short edge being 172°30' and 130° respectively. These diamonds are more difficult to produce and errors in angle more serious than in the Vickers-type. Some microhardness testers in common use are listed. A microhardness testing technique is described, and common sources of error are mentioned.

W *C 4.32*

Measuring the abrasiveness of carbonaceous deposits

British Internal Combustion Engine Research Assoc, Slough, Bucks. *Sci Lubr* 1957 Vol 9 (7) pp 16-17 (July)

The experimental procedure for determining the abrasiveness of carbonaceous deposits of burnt fuels is outlined. By means of a specially constructed apparatus, a test piece of polished mild steel or aluminium is abraded by a deposit. Wear is assessed as the difference in weights before and after test.

W *C 4.0*

A method for studying the behaviour of cutting fluids on wear of tool materials

L. V. Colwell. *ASME Prep* 1957 (57-A-160) 5 pp ; *Index Aeronaut* 1958 Vol 14 (3) p 68 (Mar)

A friction wear machine has been devised using a standard drill press. Provision has been made for varying the normal load linearly with time, and oscillating it between preset values. Normal load and friction reaction are continuously recorded. The data indicate a sharp discrimination between lubricant additives. It has been possible to identify high residual compressive stresses produced in finish grinding of cutting tools.

X *C 2.23*

The mechanical wear of metals

W. Hirst (Assoc Electr Ind Ltd, Aldermaston, Berks). *Brit Journ Appl Phys* 1958 Vol 9 (4) pp 125-132 (Apr)

The design of fundamental experiments for examining the wear phenomena encountered in the conditions of speed and loading of industrial machines is discussed. Apparatus is described in which nominal point or nominal line contact can be maintained indefinitely, and some of the phenomena observed when a lubricant is used are discussed. With carefully run-in specimens, the hydrodynamic condition of lubrication is maintained up to very heavy loads ; a method of measuring the thickness of the oil film in line contact conditions is outlined and some results given. In unlubricated conditions the phenomena of wear can be studied using simpler equipment. The main phenomena, the laws and the mechanisms of wear in unlubricated conditions are discussed, and the present state of development of theories of wear is outlined. In conclusion, some suggestions are made about the directions in which fundamental studies of wear need to be pursued. 13 illustr, 28 ref.

X *C 2.23*

The mechanical testing of thin mild-steel sheet and strip

M. L. Hughes (BISRA). *Sheet Met Ind* 1958 Vol 35 (369) pp 5-18, 22 (Jan)

Paper to Annl Conf of the Inst of Sheet Metal Engg, London, Oct 30-31, 1957.

The subject includes the following classifications : (*i*) production of cold-reduced tinplate stock, (*ii*) physical properties and physical testing, (*iii*) physical testing—hardness tests, micro indentation tests, (*iv*) tensile tests, (*v*) surface finish, and (*vi*) discussion. When hardness testing, the necessity for good surface preparation and a load suited to the specimen is important. The Rockwell superficial hardness test is critically examined, and the use of a diamond anvil is said to give more consistent results, but with lower values. The Vickers diamond pyramid hardness test is discussed, and factors influencing results are analysed, *eg* preparation of sample, and inertia or 'drag' in the hardness tester.

W *C 4.0*

Hardness tester operates semi-automatically

Lerche Machine Tools Ltd, Oakwellgate, Gateshead-on-Tyne, Co Durham. *Ind Equipt News* 1958 Vol 7 (2) p 26 (Mid-Jan)

The Briro high capacity hardness tester, manufactured by Georg Reicherter, Germany, can perform up to 900 hardness tests an hour. Operation is semi-automatic, and the tester is adaptable within the Rockwell A-K range. The test is started by a foot switch, which, when depressed by the operator, raises a spindle which raises the testpiece until it contacts the testing head. The diamond is completely shielded within the work-holding sleeve until the test is in progress. Various refinements, including a dashpot device to prevent sudden or jerky application of the load, are incorporated. 1 illustr.

W *C 4.0*

Automatic hardness and spring testing

K. Potyka. *Progressus* 1957 Vol 38 (5) pp 139-140 (Nov)

Two recent developments in automatic hardness testing are described. The Briro Automat can perform automatically all the usual Rockwell tests, and loading and changing of the workpiece can be regulated independently of each other. A movable monitor socket ensures that the testing head always makes positive contact with the specimen, thus precluding plastic or elastic deformation. Coloured signal lights indicate when a specimen falls outside the specified hardness. Specimens which do not conform need not be removed by hand : they can be automatically sorted into 'too hard' or 'too soft'. Capacity is 900 pieces an hour.

The Elasticometer-Automat AE 100 is an automatic spring testing machine with a capacity of 3,000 springs an hour. The springs are automatically sorted into 'too powerful', 'too weak' and 'passed inspection'. 6 illustr. *W* *C 4.0*

Applicability of the method of microhardness testing to investigations of binary and ternary equilibrium diagrams of metallic systems

V. M. Glasov & coll. *Zhurn Fiz Khim* 1957 Vol 31 (8) p 1891 ; *DSIR Transl Contents Lists Russ Period* 1958 (109) p 140 (Apr) (Original in Russian)

X *C 4.32*

Hardness tester has interchangeable load springs

Lerche Machine Tools Ltd, Oakwellgate, Gateshead-on-Tyne, Co Durham. *Ind Equipt News* 1958 Vol 7 (2) p 63 (Mid-Jan)

The Brivisor KL 2 hardness tester is manufactured by Georg Reicherter, Germany. Interchangeable load springs are claimed to provide greater accuracy within the tester's range of 300 g - 10 kg. It is especially suitable for testing thin wire, needles, and foils. The standard model has a microscope of 200 × magnification which incorporates a swivelling ocular head to permit the checking of both diagonals in a Vickers indentation. 1 illustr. *W* *C 4.0*

TRUING OF GRINDING WHEELS

Grinding-wheel salvaging machine

Wickes Corp, Machine Tool Div, Saginaw, Mich. *Machinery* (NY) 1958 Vol 64 (7) p 186 (Mar)

On-the-spot resizing of diamond, silicon carbide, and other types of worn grinding wheels can be carried out with the machine described, which can also be used for sizing new wheels to specific requirements. Wheels of 8 to 42 in. diameter and up to 14 in. thick can be dealt with, and it is claimed that re-sizing can be carried out in 15 to 20 minutes. *G* *D 8.0*

There are abuses . . . and abuses

Anon. *Tooling & Prodn* 1958 Vol 23 p 69 (Mar)

If a diamond dressing tool is turned periodically, then the diamond can be re-set when worn and used again. The major causes of loss are : using a tool straight into the wheel, side-swiping, leaving the tool in one position too long, and over-heating. 6 illustr.

A *C 5.0*

Endia angle and relief truing fixture

Engineering Diamonds Ltd, Coventry. *Ind Diamond Rev* 1958 Vol 18 p 58 (Mar)

A new addition to the range of Endia wheel truing equipment is the model ADS 920 angle and relief truing fixture, designed to be applied to cylindrical grinding machines for the purpose of truing angular faces for taper grinding, and also for relieving the sides of grinding wheels for grinding shouldered components. Two diamond stations are provided so that taper or relief truing of either side of the wheel can be carried out. Available in addition to this dressing fixture is base model B 921, designed for applying the unit between centres of the machine. 1 illustr.

W *C 5.0*

Technical aspects of vitrified grinding wheel manufacture. II. Materials and compositions

M. W. Gormly. *Am Ceram Soc Bull* 1958 Vol 37 (3) pp 144-147 (Mar)

Raw materials for vitrified grinding wheels are divided into three categories : abrasive, ceramic bond, and organic additions. Abrasive is usually either aluminium oxide or silicon carbide. Ceramic bonds cover a wide range of possible compositions with specific selections governed by both use requirements and process limitations. Organic additions are used to provide adequate strength for handling of unfired wheels, and also to induce additional porosity in certain soft wheels. 6 illustr, 6 ref, 4 tables.

X *D 8.0 : D 14.1*

New Reishauer profiling machine

Outils Reishauer SA, Zurich—UK distributors : Dowding & Doll Ltd, 346 Kensington High Street, London W 14. Anon. *Ind Diamond Rev* 1958 Vol 18 p 51 (Mar)

The type AM truing and profiling machine is reviewed. Independently adjustable truing tools guide the two truing diamonds, and the universal diamond truing device permits the production of profiles with standard or modified shapes. To form tip and root relief angles, truing diamonds with a slightly convex cutting edge are used ; to achieve the corrections to the grinding worm profile which this requires, the truing diamonds are controlled by suitable templates and a simple linkage. *W* *C 5.3*

Radius forming tool is suitable for general workshop use

Skil Engineers Ltd, Reynold Works, Chell St, Manchester 12. *Ind Equipt News* 1958 Vol 7 (1) p 1 (Jan)

The Skilform radius forming tool can produce convex or concave radii up to 1½ in. It is suitable for truing grinding wheels to arcs or angles, for radius grinding toolbits, form tools, and other small components, or for service as a compound table and indexing fixture. A rule and vernier on the upper slide measure to 0.001 in., and angular settings are read directly from a graduated index ring. The accessories include a diamond and holder for dressing and truing operations. 1 illustr. *W* *C 5.0*

FINE BORING AND FINE TURNING OF METALS

Use of friction discs (saws) in milling machines

V. D. Rozentsveig. *Maschinostroitel* 1957 (10) p 34 ; *DSIR Transl Contents Lists Russ Period* 1958 (109) p 55 (Apr) (Original in Russian)

X *C 6.0*

Missile parts machined in jeweler's lathe

Bendix Aviation Corp. *Machinery* (NY) 1958 Vol 64 (5) p 154 (Jan)

Servo valves with nozzle holes down to 0.0045 in. diameter are machined on Levin jeweller's lathes. A close-up view is given of an aluminium-bronze nozzle for a servo valve at completion of turning, facing, and drilling with an 0.027 in. diameter drill. The lathe is equipped with a Levin micro-drilling attachment, the drill feed being controlled by a micrometer screw and independent of operator pressure. Jeweller's lathes are especially suited for operations on miniature instrument parts which require tolerances and concentricities under 0.001 in. 2 illustr. *R* *D 10.4*

Making the Meter-Miser

C. T. Bower. *Mass Prodn* 1958 Vol 34 (2) pp 58-65 (Feb)

The Meter-Miser is a sealed rotary refrigeration compressor produced by the Frigidaire Division of General Motors Ltd. Gas tightness is ensured by extremely fine running clearances, and no glands, packings, piston rings, etc, are employed. The running clearances are of the order of 0.0002 in., and metal-to-metal contact is avoided by the use of specially selected oils. The majority of the 100-odd machine tools on the production line are of American manufacture, although fine lapping is done on British machines, *eg* the Newall Hydrolap. Surface roughness checks are made with the Talysurf, and a surface finish of 3 micro-in. is specified for certain components. Specially rigged Electrolimit gauges, equipped with diamond tipped gauging elements, are used for checking squareness. 7 illustr. *W* *C 6.0 : C 13.0 : D 15.4*

Rotating tools ream at 9 ipm

W. G. McEwan, M. Douglas (Watervliet Arsenal). *Am Machinist* 1958 Vol 102 (1) pp 104-105 (Jan 13)

Tests were carried out on a no 4 LeBlond hollow-spindle boring lathe with a rotating bar driven by a 20 hp motor, and a standard 90 mm neoprene-pack reamer with a bayonet shank. Feeds were increased from 0.015 to 0.018 in/min, with speeds from 150 to 300 rev/min for bars, and 200 rev/min for tubes. The results were a higher penetration rate, reduction of reamers from 3 to 2, and of cutting time to 40 min, *ie* by 3 hr per tube. The method is confined to certain conditions, *ie* tubes with a yield strength from 115,000 to 145,000 lb/sq in., tubes within the range of 20 to 90 mm, and machines equipped as described. 4 illustr.
R *C 6.0*

'Diamanta' precision boring machines

Anon. *Ind Diamond Rev* 1958 Vol 18 (207) p 38 (Feb)

The Diamanta IH2 is a two slide conversion of the model III, incorporating recent improvements in electro-valves and printed circuits. It can be provided with two opposed boring tools; or four tools, two on each side; or six tools, three on each side. Facts and figures covering the machines capacity are given.
W *C 6.3*

Ceramic tool bits are extremely hard wearing

Verrolec Ltd, Finsbury Pavement, Moorgate, London EC 2. *Ind Equipt News* 1958 Vol 7 (4) p 37 (Mid-Feb)

SPK tool bits are made from sintered aluminium oxide crystals. They are suitable for use at normal cutting speeds, but operate most efficiently at high speeds. They are at present available in triangular and square form, with 6 and 8 cutting edges respectively. Side rake, negative rake, and front clearance angles are each 6°, and the lip angle is 60°. 1 illustr.
W *C 12.9*

Solid-carbide countersinks cut without chatter or tearing

Atrax Co, 240 Day St, Newington, Conn. *Am Machinist* 1958 Vol 102 (6) p 160 (Mar 24)

Single-flute, solid carbide countersinks, series 1704, are available with included angles of 60, 82, or 90°, and in three cutter diameters: $\frac{1}{2}$, $\frac{3}{4}$, and 1 in., they are recommended for all materials except hardened steels. Countersinking can be done at speeds as low as 150 to 500 rpm, and the tools can be used down to $\frac{1}{8}$ in. diameter holes. *A* *C 12.0*

Machine tools. Werkzeugmaschinen

N. S. Atscherkan. *Werkstattstechnik & Maschinenbau* 1958 Vol 48 (2) p 136 (Feb) (In German)

Book, VEB Verlag Technik, Berlin, 1957, 2nd ed, 602 pp. Price DM 20.

The development of chip forming machine tools is described with special emphasis on Russian work, but also covering modern tendencies in general. [Not in library of Ind Diamond Inf Bur].
H *C 6.3*

Dymet carbide engraving cutters

Dymet Alloys Ltd, Commerce Way, Croydon, Surrey. *Metalworking Prodn* 1958 Vol 102 (15) p 671 (Apr 11)

The Dymet cutter consists of an adaptor of high speed steel which fits into the head of the engraving machine and holds a parallel shank tungsten carbide cutter secured by a grub screw. By reducing the amount of carbide required, it is claimed that the device reduces costs. 1 illustr. *F* *C 10.3 : C 12.0*

Concentrated wear of turning tools

V. Solaja (Wolverhampton and Staffs Coll of Tech, Wolverhampton). *Research* 1958 Vol 11 (4) pp 152-156 (Apr)

The phenomenon of grooving, which under some circumstances takes place at the clearance face of a turning tool, has a marked effect upon the surface finish, dimensional accuracy, and on the condition of surface layers. Some of the technological as well as fundamental aspects are discussed. The author attempts to draw attention to the importance of the subject by examples of some experimental results, and offers some suggestions for the possible causes of localized wear. Grooving is a very complex phenomenon, and fatigue appears to be largely responsible for regulating its formation. 6 illustr, 24 ref.
A *C 6.2*

When and how to use throw-away inserts for cutting tools

C. H. Wick. *Machinery* (NY) 1958 Vol 65 (5) pp 161-175 (Jan)

The results of a survey sponsored by the Wesson Co, Detroit, are given. The advantages of throw-away inserts are enumerated, *eg* elimination of tool grinding, increased cutting speeds, reduction in machine time for tool changes, low cost per cutting edge, and a reduced cutting tool inventory. Throw-away inserts have limitations, *eg* they are not suitable for dovetail form tools, specific holders have a narrow range of tool geometry, and chip control is a problem. Single-point toolholder designs are discussed. Production applications include turning, indexing of milling cutters, and boring, micro-adjustable boring units being available. Throw-away tooling is normally successful on high production automatic machines, heavy duty operations with high stock removal rates, and finishing with high carbide grades. It may not be successful for close-tolerance facing cuts, interrupted cuts, heavily scaled workpieces, or on machines in poor condition. 27 illustr. *R* *C 12.0*

The case for horizontal jig boring

W. E. Hoffman. *Tooling & Prodn* 1958 Vol 23 (12) pp 57-60 (Mar)

A horizontal jig borer, the Dixi, has been introduced, which allows greater accuracy and speed for working pieces of box-like shape, where operations have to be performed on several sides of the box. It enables as many as 16 operations to be completed in one set-up. The table can easily be reversed for boring from the opposite side of a piece, and all parts of the machine are set by optics. The horizontal jig borer can be used as an inspection gauge. 4 illustr.

A *C 6.3*

Compound (multiple cutting edge) cutting tools for serial production (on lathe)

V. V. Kuvshinski, V. A. Yurin. *Maschinostroitel* 1957 (10) p 29 ; *DSIR Transl Contents Lists Russ Period* 1958 (109) p 55 (Apr) (Original in Russian)

X *C 6.0*

The application of tools with expandable carbide and ceramic bits. Anwendung von Werkzeugen mit auswechselbaren Hartmetall- und Keramikplaettchen

R. Kuehling. *Technik* 1958 Messeheft pp 165-168 (In German)

The qualities required of ceramic and carbide tool bits are indicated, and clamping devices are described. Suitable cutting conditions for various materials and applications are tabulated. 1 illustr, 3 tables.

H *C 12.0*

[Derry Triangulator]

Oviatt Engg & Mfg Co. *Compr Air Mag* 1957 Vol 62 (8) pp 249-250 (Aug)

The Derry Triangulator is designed as an aid for solving compound angle set-up problems. Two 260° protractors are set at an angle of 90° to each other, with mounting plates on top and bottom. Quick release clutches are reported to enable any compound angle on a spherical arc to be quickly locked and adjusted to within one minute of arc accuracy. The Triangulator is available in two sizes with 90° load capacities of 150 to 300 lb ; it is suitable for checking, drilling, grinding, and boring operations requiring repeated set-ups. 1 illustr. *W* *C 5.0 : C 6.0*

Machining ultra-high-tensile steels. I

H. J. Pearson. *Aircraft Prodn* 1958 Vol 20 (2) pp 75-83 (Feb) ; *Index Aeronaut* 1958 Vol 14 (3) p 68 (Mar)

Typical of the steels considered is the DTD 551 3% chromium-molybdenum steel with a diamond pyramid hardness of 435 (minimum) for the core, and 850 (minimum) for the case. Tests are described for evaluating machinability and conditions for turning and milling. Examples are given of machined parts for aircraft undercarriages. *X* *C 4.0*

Trends in metal tool, measuring instrument and holding fixture design

F. Puetz. *Progressus* 1957 Vol 38 (4) pp PR5-PR13 (Sep)

In a review of exhibits at the 5th European Machine Tool Exhibition, Hanover, diamond tools of Ernst Winter & Sohn, Hamburg, and of Joh Urbanek & Co, Frankfurt a Main, are listed. Many non-diamond instruments for workshop use are illustrated and briefly described. 45 illustr. *W* *C 6.0*

Dimensional wear of cutting tools

E. V. Ryzhov. *Stanki i Instr* 1957 Vol 28 (12) p 24 ; *DSIR Transl Contents Lists Russ Period* 1958 (109) p 97 (Apr) (Original in Russian)

X *C 6.2*

Turning. Das Drehen

W. B. Serebrowski. *Sowjet Buchneuerschein* 1958 (2) p 19 (Mar 1) (Original in Russian)

Book, Maschgis. 1958, 3rd ed, 40 pp. Price DM -.55.

The principles of machining by turning and the design of new tools are described. [Not in library of Ind Diamond Inf Bur]. *H* *C 6.0*

The advantages of centreless microfinishing machines for cylindrical parts. Die Vorteile spitzenloser Aussenfeinhonmaschinen fuer die Bearbeitung zylindrischer Werkstuecke

E. Thielenhaus. *Industrieblatt* 1958 Vol 58 (2) pp 37-40 (Feb 25) (In German)

Centreless microfinishing has proved very suitable for finishing axles, crankshafts, and other cylindrical parts. Smooth surfaces, as well as slotted ones, can be machined. The workpiece is held between 2 rollers which also serve as conveyors. The speed of the rollers and the feed are continuously adjustable. The machine can take various honing tools oscillating at frequencies adjustable between 500-2,000 strokes/min. The pressure of the tools can also be varied continuously. 14 illustr.

H *C 13.0*

The accuracy of machine tools and of mechanical working. Die Genauigkeit bei spanabhebenden Werkzeugmaschinen und bei der mechanischen Bearbeitung

N. W. Worobjow. *Sowjet Buchneuerschein* 1958 (4) p 10 (Original in Russian)

Book, Maschgis. 1958, 128 pp. Price DM 2.

The accuracy of various machine tools is examined, and some extraneous sources of micro-roughness, such as temperature variation and low frequency oscillations, are considered. [Not in library of Ind Diamond Inf Bur]. *H* *D 15.4*

CUTTING AND MACHINING OF GLASS

' Storied windows richly dight '

Anon. *Ind Diamond Rev* 1958 Vol 18 (208) pp 49-50 (Mar)

The application of diamond grinding wheels in the working of glass for stained glass windows. Mr. Ervin Bossanyi uses a pencil edging machine and a bronze-bonded diamond wheel, presented to him by Autoflow Engineering Ltd and Diagrit Ltd.

W *C 7.23*

The strength of annealed and heat-treated glass

F. G. J. Brown, J. Ellis. *Aero Res Coun Rep & Mem* 1957 (R & M 3003/ARC17253) 37 pp ; *Index Aeronaut* 1958 Vol 14 (3) p 98 (Mar)

W *C 7.0*

The cutting of sheet glass. Das Schneiden von Glastafeln

G. Frikett. *Glas-E-K-Technik* 1958 Vol 9 (2) pp 37-42 (Feb) ; (3) pp 76-80 (Mar) (In German)

German and foreign patents dealing with the cutting of glass from 1920 onwards are reviewed. They are arranged in groups : (*i*) tool guides, (*ii*) glass cutting tables, (*iii*) glass cutting machines, (*iv*) tool setting devices, and (*v*) miscellaneous. Under (*iv*) a device is described for accurately adjusting the inclination of the diamond to the surface and the direction of cutting (GP 496,854). USP 2,361,049 describes a device for ensuring that the cutting pressure is always uniform. 8 illustr. *H* *C 7.2*

The polishing of glass

E. Brueche, H. Poppa. *Soc Glass Technol Journ* 1956 Vol 40 (197) pp 513T-519T (Dec); *Glastechn Ber* 1955 Vol 28 (6) pp 232-242 (June); 1956 Vol 29 (5) pp 183-191 (May); abstr *Bibl Ind Diamond Appl* 1955 Vol 12 p B213 (Aug); 1956 Vol 13 p B178 (July); *Ind Diamond Rev* 1958 Vol 18 pp 29-36 (Feb) (Original in German)

W *C 7.23*

Basic research on glass

Triplex Fundamental Res Lab. *Lab Pract* 1958 Vol 7 (4) pp 233-235 (Apr)

The only electron microscope in Gt Britain working on basic research in glass is being used to study the molecular disposition of the constituents and hence the stresses likely in the structure. X-ray diffraction measurements and energy changes measured by thermodynamic techniques are also used to study atomic structure; the information is applied to the design of safety glass. Mechanical, optical, temperature, and chemical studies are also carried out on glass in this laboratory. A workshop, where engineering applications can be studied, is also in operation. 5 illustr.

F *C 7.5*

Instruments for the determination of the physical properties of glass. IV. Instrumentelle Hilfsmittel zur Bestimmung der physikalischen Eigenschaften der Glaeser. IV

H. Schulz. *Glas-E-K-Technik* 1958 Vol 9 (3) pp 73-76 (Mar) (In German)

(Concl). This includes an examination of the microhardness determinations on glass surfaces. The relation between the results obtained by various methods is analysed, and the effect of load, plastic deformation, and cracking is discussed. 7 ref, 7 tables.

H *C 4.0 : C 7.0*

MACHINING OF STONE, ETC

Refractory cutter will handle most hard materials

Cutrock Engg Co Ltd, Dollis Mews, Dollis Park, London N 3. *Ind Equipt News* 1958 Vol 7 (4) p 35 (Mid-Feb)

The Cutrock refractory cutting machine employs a Neven 12 in. diamond impregnated cutting disk to machine bricks, tiles, ceramics, etc. Maximum slitting depth is 3½ in., and maximum cutting length is 11 in. A square guide and an adjustable angle guide are provided on the 12 × 12 in. cutting table. The machine is driven by a double V-belt powered by a 1½ hp motor. 1 illustr.

W *C 5.0 : C 8.7*

Instrumentation in cement and concrete research

R. Hammond. *Instrument Pract* 1958 Vol 12 (4) pp 380-387 (Apr)

In strain measurement in cement and concrete manufacture, a Demec strain gauge is used; it incorporates a fully jewelled dial gauge calibrated in divisions of 0.0001 in., and is made of invar metal. 9 illustr.

A *D 15.0*

Germanium saw cuts at any angle

Zwicky (London) Ltd, 193 Victoria Street, London SW 1. *Ind Equipt News* 1958 Vol 7 (4) p 77 (Mid-Feb)

The Bunter sawing machine uses a diamond impregnated copper disk for cutting germanium. Diameters up to 1 in. can be cut to a general tolerance of ±0.05 mm. 1 illustr.

W *C 5.0 : C 8.7*

Cutting and grinding ceramics

R. F. Rea, J. W. Ripple. *Am Ceram Soc Bull* 1957 Vol 36 (5) pp 163-167 (May); abstr *Bibl Ind Diamond Appl* 1957 Vol 14 p B168 (Sep): *Ind Diamond Rev* 1958 Vol 18 pp 52-57, 59 (Mar)

W *C 8.72*

BP 788,720 **Carborundum Co.**

(Dec 21, 1955—conv date, USA)

Diamond abrasive blades

Refers to saw blades for cutting contraction joints in concrete highways. Failure frequently occurs because of wearing through of the steel centre before the abrasive segments have been worn out. Such early failure can be avoided by making the segments of L-shape with one leg of the L extending along the peripheral edge of the land of the steel centre upon which the segment is mounted, as shown in Fig 1. The

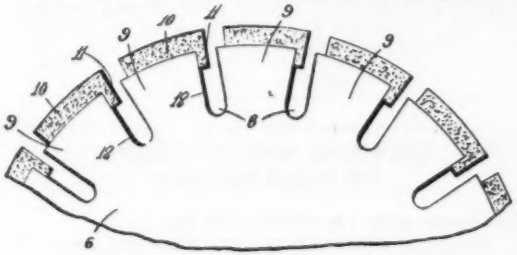


Fig 1. A section of the blade. BP 788,720.

diamond segment 10, 11, is slightly wider than the steel centre 6, and secured to its associated land 9 by *eg* brazing. The diamond segments may be made in a conventional manner as described in BP 359,637; 516,702; 532,890. Maximum cutting efficiency may be obtained by providing two bond compositions, to only one of which a chosen amount of diamond is admixed. The diamond-free bond composition is then used as a layer in the mould bottom for forming the inner portion of the segment. (8 claims, 5 illustr).

J *D 8.01*

ROCK DRILLING

Resharpening rock drill bits

Bay State Abrasive Products Co. *Compr Air Mag* 1958 Vol 63 (2) p 46 (Feb)

A brochure gives advice on the selection and use of grinding wheels for resharpening percussion and rotary rock drill bits. In addition, general recommendations for regrinding rock drill bits are given.

W *C 12.22*

Improving the durability of bits

B. N. Fridman & coll. *Gornyi Zhurn* 1958 (1) p 75; *DSIR Transl Contents Lists Russ Period* 1958 (109) p 33 (Apr) (Original in Russian)

X *C 9.2*

The use of carbides in mining. Hartmetalle im Bergbau

W. A. Tschurin. *Sowjet Buchneuerschein* 1958 (3) p 23 (Mar 3) (Original in Russian)

Book, Metallurgisdat. 1958, 160 pp. Price DM 2.50. [Not in library of Ind Diamond Inf Bur].

H *C 9.22*

WIRE DRAWING

Miniature permanent magnets

I. L. Cooter, R. E. Mundy (US Nat Bur Standards). *Instrument Pract* 1958 Vol 12 (4) pp 358, 366 (Apr)

To obtain permanent miniature magnets, Cunife wire is first cold drawn to 0.020 in. through Carboloy dies, and further reduced to 0.005 in. through diamond dies.

A *C 11.0*

Preparation of fine wires for metallographic examination

G. L. Davis (Mullard Res Lab, Mitcham Junction, Surrey). *Journ Sci Instr* 1958 Vol 35 (4) p 149 (Apr)

A means of mounting fine wires for electrolytic polishing and etching for metallographic examination is described. Fine grinding and rough polishing was done by papers and diamond dust, and was completed electrolytically. 1 illustr.

F *C 11.0 : C 12.61*

GRINDING AND POLISHING OF HARD METALS

Test results make a troubleshooter's list

F. Pearlstein (Pitman-Dunn Labs, Frankford Arsenal). *Am Machinist* 1958 Vol 102 (1) pp 110-112 (Jan 13)

Preliminary tests at Frankford Arsenal show that electrolytic grinding is affected by the electrolyte applied, 5% potassium nitrate being the optimum solution. This was used in the tests. A modified Cincinnati grinder with a 6 in. single layer diamond wheel with about 0.001 in. diamond protrusion was used to grind ½ in. square sintered carbide tools under various conditions, in order to show the effects of voltage and current, work-wheel pressure, rotational wheel speed, and area of work-wheel contact. About 6 cubic in. carbide was removed without detectable wheel wear. Tests were made on a Hammond X-266 grinder to examine results in offhand and chipbreaker grinding, grinding head form and band seat tools, and regrinding worn and chipped tools. Chipbreakers were ground electrolytically on single-point tools with a metal-bonded diamond wheel, taking a single pass to full depth with light pressure against each tool. Grinding time was longer than by conventional methods, wheel losses much less. Over 900 chipbreakers were ground before the wheel needed truing, a diamond wheel normally grinding about 150 chipbreakers. Tool edges were slightly rounded in electrolytic grinding, but this was immaterial. Form tools were ground with a single pass by a 7 in. diamond-impregnated wheel of the desired contour. Test conclusions are that electrolytic grinding increases diamond wheel life, and that diamond efficiency is increased by using single-layer wheels. Water glass as an electrolyte permits sharp work edges, but grinding is slow. Higher currents are drawn as wheel speed and wheel-work pressure are increased, with increased cutting rate. Contact area has the same effect. Worn tools are reground with minimum carbide loss. 6 illustr.

R *C 5.3*

How to improve abrasive belt performance

R. W. Reed (Minnesota Mining & Mfg Co). *Plant Engg* 1957 Vol 11 (12) pp 138-140, 230 (Dec)

The use and maintenance of abrasive belt machinery is discussed. Common problems, *ie* out of balance contact wheels, are analyzed, and solutions are suggested. 2 illustr, 1 table.

W *D 8.0*

The production of components for Lambretta motor scooters

Innocenti Società Generale per l'Industria e Meccanica SpA, Milan. *Machinery* (London) 1958 Vol 92 (2356) pp 60-72 (Jan 10)

Methods for manufacturing 2 piston sizes, for 125 and 150 cc engines, are described. Gravity die cast pistons are heat treated, and various rough turning, boring, and facing operations carried out on a Cimat machine. Each spindle at the right-hand end of the Cimat fine boring machine carries a sintered carbide and a diamond tool for successive semi-finish and finish boring cuts on gudgeon pin holes, and a carbide tool for producing a 45° chamfer at the bore end. For cutting the circlip grooves, a 1,240 rev/min spindle speed is employed, and 4,900 rev/min for finish boring, with 0.0007 in. table feed/rev. The machine takes 2 min 18 sec for operations on 2 pistons. The outside of the piston is finish ground on a Fortuna Werke AG (Vaughan Assoc Ltd) form grinding machine with a cam-controlled workhead. The various piston diameters are obtained by form-truing the grinding wheel with equipment mounted on a horizontal slide above the wheel, a plate cam controlling the position of the truing diamond in relation to wheel periphery. A special Norton wheel is used with a soluble oil coolant. The width of the grinding wheel permits the full piston length to be plunge ground. 18 illustr.

R *C 5.0 : C 6.0 : C 13.0*

The new Churchill model NB horizontal-spindle surface grinder offers increased scope and usefulness

Churchill Machine Tool Co Ltd, Coventry Rd, South Yardley, Birmingham 25. *Brit Machine Tool Engg* 1957 Vol 39 (189) pp 137-142 (Oct-Dec)

The NB model is suitable for general purpose work in the grinding shop, and also for toolroom work. The 18 × 6 in. worktable provides an hydraulic longitudinal travel, steplessly variable up to 60 ft/min, and hand motion of the worktable is hydraulically interlocked with the power traverse. The hydraulic cross-feed movement operates automatically at each reversal of the longitudinal traverse stroke. The range of automatic feeds is variable from 0.008 to 0.060 in. at each reversal of the table, and maximum cross-traverse movement is 7 in. The fine-feed adjuster permits cross-feed movements of 0.0001 in. The wheelhead carries a precision-ground Nitralloy steel spindle, and moves vertically in a dovetailed slide. Vertical feed is adjustable in increments of 0.0001 in. A high-speed horizontal-spindle grinding attachment is available, as is the equipment for form grinding by the crushed wheel method. Diaform wheel forming devices can be used, and an illustration shows this in use. The form is generated by the use of a template sealed 5 × larger than the form required on the grinding wheel. The tracer is lightly traversed over the profile of the template, and the path of the tracer is transmitted to the truing diamonds which form the wheel to the desired shape. 13 illustr.

W *C 5.3*

Reciprocating tool grinders grind tool and chipbreaker

Ex-Cell-O Corp, 1200 Oakman Blvd, Detroit 32, Mich. *Am Machinist* 1958 Vol 102 (1) p 156 (Jan 13)

Two new machines are designed for conventional grinding at one end and chipbreaker grinding at the other. A vertically adjustable table, mounted beneath the reciprocating chipbreaker wheel, accommodates an adjustable tool block fixture which holds the tool in place while grinding the angle on the chipbreaker groove. Model 142 is for conventional grinding with vitrified or diamond wheels, model 264 for electrolytic grinding with metal-bonded diamond wheels. 1 illustr.

R *C 5.3*

Internal grinder is suitable for small and large batch work
Buck & Hickman Ltd, Otterspool Way, Watford By-Pass, Watford, Herts. *Ind Equipt News* 1958 Vol 7 (4) p 66 (Mid-Feb)

The American internal grinder, the Bryant 1109, is now being made in this country. It has a mechanical traversing mechanism for grinding both tapered and parallel small bores. Tapers of up to 90° included angle can be ground by swivelling the workhead, and a dial indicator enables slight corrections in taper and parallel grinding to be made. A diamond holder mounted on the workhead has adjustment to accommodate various sizes of work ; this is normally manually operated, although automatic operation is available. The machine has a total chuck swing of 9 in., a total grinding stroke of 3½ in., and a maximum traverse stroke and bore diameter of 6 and 3 in. respectively. 1 illustr. *W* *C 5.3*

Grinding and lapping machine for carbide and steel tools
Masmot J. Patrovic & Co. *Progressus* 1957 Vol 38 (4) p 114 (Sep)

The Masmot Q14 is claimed to be suitable for rough and finish grinding. It is provided with silicon carbide wheels which can be fully used up. Single- and triple-wheel models are available, and machines with any number of wheels can be provided to order. The wheels can be rotated at 3 speeds in either direction, and provision is made for a dressing attachment. Silicon carbide wheels are reported to give a cutting edge quality comparable to that produced by a diamond wheel of 50 μ mesh size. For a higher finish, diamond wheels can be attached and operated at 3,000 rev/min. A diamond wheel can also be used for series grinding of chipbreakers : economies in machining time achieved by the use of diamond wheels for this purpose amount to 70%. 1 illustr. *W* *C 12.21*

How to improve your cylindrical grinding
J. A. Mueller (Carborundum Co). *Machinery* (NY) 1958 Vol 64 (5) pp 129-133 (Jan)

Basic factors influencing cylindrical grinding are defined as traverse and work speed, width of cut, infeed, and run-off. Experimental data are given to demonstrate how changes in these factors affect the product. A list gives a number of basic principles of cylindrical grinding, *eg* fast traverse speeds produce fast stock removal rates, and vice versa ; increased traverse speeds produce a rougher finish, increased infeed rates, faster stock removal, and lower grinding efficiency. Soft grade, fine mesh wheels should be used for hard materials, and vice versa. Soft wheels should be used for grinding large, hard wheels for small areas, and the largest wheel in diameter and width consistent with part size. 7 illustr. *R* *C 5.3*

What type of wheel to choose for surface grinding. Quel type de meule choisir pour la rectification des surfaces planes
Anon. *Machine Mod* 1958 Vol 52 (588) pp 22-24 (Mar) (In French)

The relative advantages of grinding with the periphery of circular wheels, the flat side of cup wheels, or abrasive segments are discussed, with particular emphasis on the abrasive segments. 2 illustr.
H *C 5.0*

BSA centreless grinder No 4
Anon. *BSA Tools Group Journ* 1957 Vol 3 (7) pp 2-3 (July-Sep) ; abstr *Bibl Ind Diamond Appl* 1957 Vol 14 p 3183 (Oct) ; *Ind Diamond Rev* 1958 Vol 18 pp 46-48, 59 (Mar)
W *C 5.0*

Plug gauges by the hundred-thousand
Pilot Plug Gauge Co Ltd. *Brit Machine Tool Engg* 1957 Vol 39 (189) pp 151-153 (Oct-Dec)

The process of manufacturing plug gauges to extremely fine tolerances is described. Handles are produces from extruded hexagonal bar of high tensile heat-treated aluminium which can be cut to length on a Wadkin machine, and then finished on single-spindle bar automatics, or they can be finished outright on the single-spindle bar automatics. Grinding to size is done in two operations on Churchill grinders which produce an accuracy of the order of 0.000025 in. They are then lapped to a surface finish of 0.6 micro-in., and the diameters of the ends true to parallelism within 0.000004 in. The diamond lapping compound serves at this stage to reveal any inconsistency in hardness : the compound penetrates soft spots, and shows up in dull grey spots. Pieces thus affected are scrapped. For the inspection of small gauges down to 0.002 in. diameter, the Sigma comparator heads are locked in one position, and the 1/16 in. wide stylus bars are diamond lapped flat to the anvils. 6 illustr. *W* *C 13.0*

Some notes on plug gauge manufacturing tolerances
F. W. M. Lee (Pilot Plug Gauge Co Ltd). *Brit Machine Tool Engg* 1957 Vol 39 (189) pp 154-155 (Oct-Dec)

Discussion and comment on British Standards.
W *C 13.0*

Honing 10,000 sq in. to 32 mu-in.
W. M. Stocker. *Am Machinist* 1958 Vol 102 (1) pp 102-103 (Jan 13)

A perforated bronze suction shell, 24½ in. ID × 28 in. OD × 140 in. long, containing 67,000 holes of 3/16 in. diameter, was honed on a Barnesdril machine with a 120-125 mesh roughing stone, and a 320-389 mesh stone for finishing the last 0.003 to 0.004 inches. The coolant consisted of 60 parts kerosene and 40 parts Union base. Honing was completed in 4 hours, with frequent miking as the operation progressed, in addition to preliminary miking. Risers were used to convert the 24 in. stone holder to the 24.5 in. bore to be honed. Maximum machine capacity is 42 in. ID by 55 ft long, maximum reciprocation speed 65 ft/min, and 10 to 102 rev/min of the honing head. Suggested speeds of rotation and reciprocation are given for various metals with diameters from 2 to 30 in. and lengths beyond 10 ft. Coolant recommendations also are given.
R *C 13.3*

How to machine difficult workpieces
C. R. Stroup (Anocut Engg Co). *Am Machinist* 1958 Vol 102 (1) pp 106-108 (Jan 13)

Principles, operating techniques, and most recent developments in the application of electrolytic grinding are discussed. Formed wheels are produced by rolling a single diamond layer into the face of a formed copper disk with a hardened steel crush roll. When the wheel is formed, the roll is disengaged and a thin film of light machine oil applied ; 120 mesh diamond powder is sprinkled on the wheel, ½ ct/sq in. for max power. Wheel and roll are re-engaged and rotated by hand until the engagement is within 0.001 in. of that before the diamonds were added. Three diamond layers should be applied. The wheel is ready for short runs and may be restored to tolerance by adding a layer of diamond powder. For long runs, a thin nickel layer should be plated over the diamonds to grip them tightly to the wheel. Diamonds may be reclaimed on completion of the run. 4 illustr.
R *C 12.0*

A new metallographic polishing machine. Nouvelle polisseuse métallographique

Anon. *Machine-Outil Franç* 1958 Vol 23 (130) pp 109. 111 (Mar) (In French)

A new polishing machine is semi-automatic and can use tap water as a coolant. The specimen is mounted horizontally and eccentrically over the disk which can be easily replaced, and can take any surface from soft cloth to diamond powder. *H* *C 12.23*

New measuring devices. Neuerungen auf dem Messgeraetesektor

Anon. *Technik* 1958 Messeheft p 203 (In German)

A description of various instruments exhibited by Karl Marx, Magdeburg, includes a pneumatic precision measuring device for use during grinding. A carbide tipped finger is pressed against the workpiece, and activates a pneumatic meter which indicates lengths to within ±50 microns. Lack of circularity is also indicated. Similar devices can also be used on honing machines, and the dimensions are shown on a scale calibrated in microns. The maximum range is ±100 microns. 1 illustr. *H* *D 15.0*

Liquid honing—a new method of surface finishing. Strahllaeppen—ein neues Feinbearbeitungsverfahren

K. E. Baldauf. *Techn Rdsch* 1957 Vol 49 (23) pp 11-13. 15, 17, 19; *Draht* 1958 Vol 9 (3) p 98 (Mar) (In German)

H *C 13.3*

Mechanized polishing of short cylindrical components

V. M. Braslavski. *Mashinostroitel* 1957 (10) p 7; *DSIR Transl Contents Lists Russ Period* 1958 (109) p 55 (Apr) (Original in Russian)

X *C 13.0*

Automation in grinding and polishing. Ueber die Automatisierung beim Schleifen und Polieren

W. Burkart, O. Friedrich. *Industrieblatt* 1958 Vol 58 (2) pp 35-37 (Feb 25) (In German)

11 illustr. *H* *C 5.0 : C 13.0*

Threading gun tubes three times faster

F. J. Clas, A. Chismark. *Metalworking Prodn* 1958 Vol 102 (15) pp 651-652 (Apr 11)

A new Jones & Lamson thread grinder is described which is claimed to speed up the production of 90 mm and smaller calibre gun tubes. The gun tube is secured by two power-driven chucks, and thereafter the grinding cycle is automatic. The machine is claimed to give great accuracy, and is provided with a pantograph wheel dressing device for deep wide thread forms, symmetrical or buttress, of any included angle from 0 to 180°, and can dress 1¼ in. wheels to a form depth of ⅜ in. Cooling and lubrication data are given. 3 illustr. *F* *C 5.3*

Now, tool control to 5 millionths

Torrington Co. *Am Machinist* 1958 Vol 102 (6) pp 120-121 (Mar 24)

The Torrington Co has succeeded in reducing the minimum increment of wheel-slide motion on a centreless grinder, so that the grinder can consistently respond to feedback orders in the millionth-of-an-inch range. They have done so by replacing the leadscrew with the Inchworm linear actuator motor. By means of magnetostriction, the armature is made to move longitudinally and can be closely controlled. Movement of the armature through the clamping, magnetostrictive, and unclamping actions moves the wheel slide. Slide adjustments are made automatically by electronic gauging equipment. 3 illustr.

A *C 5.3*

Abrasive jet provides smooth finish

Lewis Welding and Engg Corp. *Tool Eng* 1958 Vol 40 (2) p 95 (Feb)

A fine finish is being given to aircraft and missile parts by spraying with a jet: the proportions of the three components (air, liquid, and abrasive) of the jet are all variable. The components are handled between rubber belts, and are rinsed after treatment. The work cycle is fully automatic, and satisfactory finish has been obtained on aluminium, copper, mild steel, stainless steel, and titanium. 1 illustr.

G *C 13.0*

New opinions on grinding and polishing especially of metallographic specimens

Z. Ministr. *Hutnik* 1956 Vol 6 (9) pp 257-262 (Sep); *Battelle Techn Rev—Abstr* 1957 Vol 6 (2) p 136a (Feb) (No 2917); abstr *Bibl Ind Diamond Appl* 1957 Vol 14 p B88 (May); *Ind Diamond Rev* 1958 Vol 18 pp 26-28 (Feb) (Original in Czech)

See also *Ind Diamond Rev* 1958 Vol 18 pp 7-10 (Jan); *Ind Diamond Abstr* 1958 Vol 15 p A47 (Mar)

W *C 12.61*

The manufacture of Parkinson plain and universal millers, Sunderland gear planers, dividing heads, gear testers and vises

J. Parkinson & Son (Shipley) Ltd, Shipley, Yorks. *Brit Machine Tool Engg* 1957 Vol 39 (188) pp 97-134 (July-Sep)

A survey of manufacturing processes and techniques used in production, and of the machine tools employed. In the production of Sunderland cutters where a fine pitch is required, horizontal surface grinders equipped with special diamond wheel truing and forming fixtures are employed. The company undertakes the sharpening of cutters used by customers.

W *C 5.0 : C 12.21*

Centerless grinding machine grinds parts up to 1¾ in. in diameter

Cincinnati Grinders Inc, Cincinnati 9, Ohio. *Am Machinist* 1958 Vol 102 (6) p 143 (Mar 24)

The Filmatic No 1 centreless grinder, recommended for rapid production of small drills, pins, punches, shafts, and instrument parts, has a hydraulically actuated unit which trues the grinding wheel. This unit has a micrometer diamond adjusting dial, truing rate selector knob, and direction control lever. Straight screw type diamond truing is supplied for the regulating wheel. 1 illustr. *A* *C 5.3*

The works and methods of Kendall & Gent Ltd, machine tool makers

Kendall & Gent Ltd, Gorton, Manchester. *Brit Machine Tool Engg* 1957 Vol 39 (187) pp 54-92 (Apr-June)

An exhaustive study of the company's history, products, and methods includes a section on the production of inserted-blade cutters. The toolroom is responsible for servicing tungsten-carbide tools, and facilities for grinding and diamond lapping are provided. Machine tools and set-ups throughout the works are described, and the uses of cutter-grinders, surface grinders, etc, are illustrated. 119 illustr.

W *C 6.0 : C 12.21 : C 13.2*

Grinding. Das Schleifen

P. I. Jastscherizyn. *Sowjet Buchneuerschein* 1958 (2) p 20 (Mar 1) (Original in Russian)

Book, Maschgis. 1958, 3rd ed, 48 pp. Price DM -.55. The principles of metal grinding, grinding wheels, and various methods of grinding are described and explained. [Not in library of Ind Diamond Inf Bur].

H *C 5.0*

Gold-dyed aluminum used in Russian watches

A. J. Steiger. *Met Finish* 1958 Vol 56 (2) pp 54, 64 (Feb)

A process is described which Russian watchmakers are using in order to dye aluminium for use as watch and clock cases. Aluminium strip with a mirror-finish is required, and the heat-treated blanks are easily machined with diamond and hard alloy tools.
W *C 12.0*

USP 2,804,722 (Aug 24, 1953) **L. O. Carlsen, E. D. Dammert, Gleason Works**

Cutter sharpening machine

The grinding face of the frusto-conical wheel oscillates across the face of a blade of a disk and face milling cutter for bevel gears, so that the locus of contact with the cutter blade lies in a plane perpendicular to the axis of oscillation. The wheelhead is mounted on a turret adjustable about an axis also perpendicular to the axis of oscillation. The turret is arranged on the frame in a vertically adjustable slide.

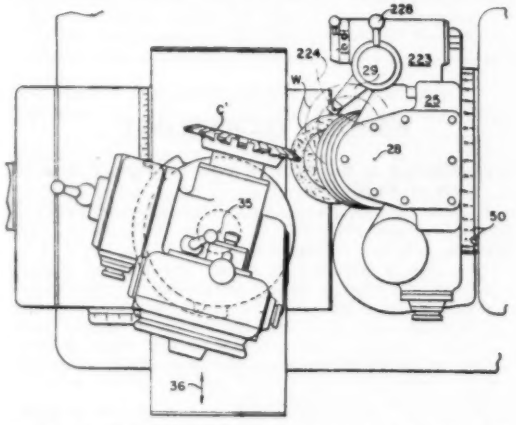


Fig 2. Partial plan view with mounted disk cutter C¹. USP 2,804,722.

The oscillating wheelhead is periodically swung into a position clear of the cutter blade to enable indexing of the milling cutter. A wheel truing device is mounted on the turret to be operated while the wheel is in the indexing position. Fig 2 is a partial plan view of the machine with a disk cutter C^1 mounted in the workhead. Grinding wheel W is in the working position on turret 25. The axis of oscillation is 28. The wheel is swung back periodically into its index-dress position shown in broken lines. The arcuate path of the truing diamond is indicated by 224. (22 claims, 24 illustr). Ref: 13 USP.
J *C 12.01*

USP 2,804,727 (July 15, 1955) **W. D. Schmidt, Heald Machine Co**

Grinding machine

Automatic exchange of a worn grinding wheel for a new wheel for completely automatic grinding is made possible by fixing the tubular wheel 16, shown in Fig 3, to the shaft 15 with a thermoplastic cement only, the cement having a melting point well above the normal temperature to which the wheel will be raised during normal grinding operations. When the wheel is worn, the cement is automatically heated by a high frequency induction coil 56 to loosen the wheel which is automatically grasped by a device having fingers 58, and withdrawn axially. A new wheel is then automatically placed on the shaft by the same device, and molten cement introduced between shaft and wheel. The tubular wheel is thus fastened along its entire internal bore surface, and has greater resistance to torque and radial forces. Further, such a wheel is cheaper to produce and can be worn down to a lesser diameter than ordinary wheels. The use of larger shafts causes less deflection under load. (18 claims, 5 illustr). Ref: 6 USP.
J *C 5.01*

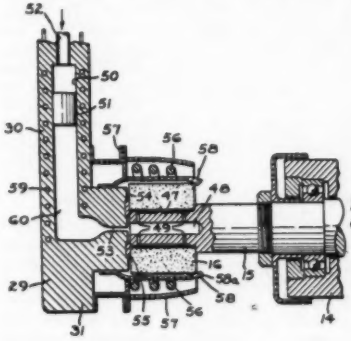


Fig 3. Wheel changing element. USP 2,804,727.

NEW MACHINING METHODS

A new spark-machining technique

J. D. Shoemaker (Lockheed Aircraft Corp). *Machinery* (London) 1958 Vol 92 (2356) pp 74-76 (Jan 10)

Spark machining is extensively used for finishing the cavities of impact extrusion dies. The work is located in a fibre-glass trough beneath the electrode which is fed down by a Servometer. The end of the electrode becomes undersize through erosion, so that electrode length should be greater than height of the die block. Correct pressure and volume of dielectric coolant are important. Irregularities may be removed by refinishing one wall at a time with a trimmed electrode. Increased accuracy was obtained by mounting the spindle below the work, when the original milling machine was abandoned. Clearance is eliminated, and accurate alignment assured by confining the spindle in 2 vee rollers by means of a flat pressure roller. Continuous arcing between electrode and work reduces cutting time by 50%. Ridges in the cavities are eliminated. A plastic dome encloses the work and is connected to a suction line for the electrolyte. Spark machining produces an 80 to 90 micro-in. finish, which is lapped to a final finish of 5 to 10 micro-in. 4 illustr.
R *C 12.9*

A device for the preliminary cutting of single-crystal metallic rods to a desired orientation

T. B. Vaughan (Birmingham Univ). *Journ Sci Instr* 1958 Vol 35 (4) pp 147-148 (Apr)

The requirements in cutting single-crystal metallic rods of a desired orientation are: (*i*) the provision of sufficient degrees of freedom to allow any plane of the crystal to be cut, (*ii*) the avoidance of distortion during cutting, (*iii*) the production of plane cut surfaces, and (*iv*) the time to produce a strain free specimen should be as short as possible. A machine designed to cover these requirements is described. The crystal is cut by a jeweller's saw held against a hardened steel edge, and orientation is determined by having back-reflexion photographs. The accuracy obtainable is within about 2°, and for greater accuracy this preliminary cutting must be followed by diffractometer techniques. 2 illustr, 5 ref.
F *C 12.61*

Drilling with electron beams. Ueber das Bohren mit Elektronenstrahlen

Anon. *Experimentelle Technik der Physik* 1957 Vol 5 (5) pp 236-237 (In German)

Synthetic ruby platelets can be drilled by an electron beam produced by the usual fine focussing equipment of an electron microscope. Holes of 0.1-0.2 mm diameter can be drilled in 10 to 15 sec. To avoid charging the material it must be heated to the temperature of glow (minimum beam energy 1.7 watts), and must be preheated to prevent cracking. It was found that the hole diameter depends not so much on the beam diameter as on its intensity. With energies of less than 1.7 watts, smaller holes of diameters down to 0.02 mm have been drilled, but they were not circular in cross section. *H* *D 11.4 : D 15.6*

Subzero temperatures facilitate production processes

R. A. Wason. *Tool Eng* 1958 Vol 40 (2) pp 107-115 (Feb)

Low temperature treatment can improve the machinability of a number of materials, including plastics, aluminium, bronze, chrome-molybdenum steel, and titanium. The methods used vary from deep-freeze techniques to flooding cutting tools with refrigerated coolants. Other uses of cooling techniques include expansion fitting (the reverse of the commonly used shrink-fit method), treatment analogous to heat treatment, and dehydration of process gases. 9 illustr, 1 table. *G* *C 6.0*

USP 2,804,724 (Feb 24, 1956) **C. J. Thatcher**

High speed machining by ultrasonic impact abrasion

High frequency vibratory abrasive cutting of hard Materials has previously been confined to the polishing or etching of surfaces, to the drilling of holes, the engraving of very hard metals, gems, and glass. It has been customary to employ very thick slurries, *eg* 1 lb comminuted boron carbide in 1 quart of water. Slurries of high concentration cause caked deposits on open surfaces, and such deposits develop also on the actual locus of impact abrasive cutting action, *ie* under the tool end and over the face to be abraded. This has hindered the widespread use of this art. It has already been suggested that soluble compounds such as sodium bicarbonate, carbon dioxide gas, or solid carbon dioxide (dry ice) should be added to the abrasive slurries (USP 2,736,148 - Thatcher) as resonant bubbles of gas can increase the kinetic energy of the liquid film as much as 14,000 times over that attainable in gas-free irradiated aqueous slurries. Tests have also shown that the thermal conditions and factors at and near the tool tip play an important role (see also USP 2,774,193 - Thatcher *et al*). A copious stream of cold liquid slurry over the entire tool holder cone should therefore supplement the restricted flow of liquid to and from the abrasion point with its diminished cooling effect, so that, by controlling the rate of flow, the temperature of the tool and surface may also be controlled. The slurry to be circulated underneath the tip of the tool should be a thin slurry such as 1 lb boron carbide per gallon of water. (7 claims, 1 illustr). Ref : 6 USP.

J *C 12.01*

LOAN SERVICE CHANGE

Owing to reorganisation of the library, it will be necessary to suspend a part of the loan service operated by the Industrial Diamond Information Bureau. Between May 1 and Nov 1, only periodicals and bound copies of periodicals will be available for loan ; books other than bound copies of periodicals, eg text books, will not be available during that period. Regular users of this service will be notified immediately it is resumed. Any inconvenience caused by this interruption is sincerely regretted.

USP 2,804,725 (May 17, 1954) **E. C. Dench, Raytheon Mfg Co.**

Apparatus for precision contouring

An electromagnetic field is applied to a magnetostrictive element having an integral cutting tool to produce high frequency oscillation of the tool. The tool is fed progressively into the workpiece (electrically, or by fluid pressure). In such arrangements, the impact force which can be developed is limited and, therefore, the cross-sectional area of the opening or other configuration worked hitherto has been small. Many times larger areas, however, can be worked despite these limitations when using a cutting edge in the form of a circular or other closed loop corresponding in contour to the contour of the opening or article desired, with the transverse thickness of the cutting edge reduced to an extremely fine dimension, *eg* a diamond impregnated cutting ring, which is then constantly advanced at a rate proportional to the frequency of vibration. (12 claims, 6 illustr). Ref : 12 USP ; see especially 2,632,858. *J* *C 12.01*

POWDER TECHNOLOGY

A contribution to the study of comminution : a modified form of Kick's law

J. A. Holmes. *Trans Inst Chem Engs* 1957 Vol 35 (2) pp 125-141 ; *Staub* 1958 Vol 18 (3) pp 91-92 (Mar 1) (In German, original in English)

The energy required to reduce the size of a given particle has been variously calculated in terms of the original particle diameter. From the theory of crushing, particularly in a ball mill, the author deduces a more general formula, and experiments on many different types of material show that this is in better agreement with observation than any of the three principal formulae previously accepted.

H *D 7.5*

Liquid honing. Strahlaeppen

Forschungsinstitut fuer bildsame Formung der Metalle. *Technik* 1958 Vol 13 (2) p 115 (Feb) (In German)

A suspension of abrasive in water is projected through a nozzle by means of compressed air at speeds up to 700 m/sec. The absence of a tool of given shape makes this method suitable for finishing surfaces of any shape. In the case of dies for bicycle cranks the saving in time of production was 80%, and the life of the die was increased by 10 to 50%. The finish obtainable varies between 0.5-10 microns, according to the quality of the original surface and the grain size of the abrasive.

H *C 13.3*

Sampler for powdered material

W. R. Kennedy jun, (E. I. du Pont de Nemours & Co). *US Atomic Energy Commission* DP-231, 1957 8 pp ; *Battelle Techn Rev—Abstr* 1958 Vol 7 (3) p 197a (Mar) (No 3932)

Automatic mechanism obtains a representative sample of free-flowing powdered material dropping down a vertical pipe. Device embodies the principle of an oscillating slotted 'shutter' which momentarily admits a small increment of process material to a collecting vessel. *X* *D 13.5*

Subsieve particle size measurments on porcelain materials

R. H. Lester (Insulator Dept, GEC, Baltimore, Md.). *Am Ceram Soc Bull* 1958 Vol 37 (3) pp 129-134 (Mar)

A *D 7.5*

DIAMOND TOOL PRODUCTION AND DIAMOND RECOVERY

Diamond tools. Diamantwerkzeuge

Anon. *Industrie-Anzeig* 1958 Vol 80 (20) p 290 (Mar 11) (In German)

Vitrified-bonded diamond grinding wheels have good cutting properties, and are used for sharpening carbide tools. They are made with a smooth profile up to 150 mm diameter, and with diamond grain sizes upwards from D50. Profiled diamond wheels are used on glass and ceramics. Diamond-impregnated core drills of any diameter above 1 mm are available. Precious metals, *eg* germanium, are cut by diamond-impregnated saws.
H *C 1.5 : C 6.0 : C 12.21 : D 8.0*

Micronic filtration

Industrial Filtration Co, Lebanon, Indiana. *Mechanical Engg* 1958 Vol 80 (3) p 178 (Mar)

A filter specifically designed for use on cutting oils and coolants is capable of handling up to 1,000 gal/min. It incorporates automatic flow reversal at intervals for cleaning purposes, without interruption of the effective coolant flow. *G* *D 14.2*

New method of mounting stones in diamond tools

Gen Electr Co. *Engs Digest* 1958 Vol 19 (3) p 123 (Mar)

A method is described for brazing small diamonds into tools using titanium hydride as a wetting agent. It is claimed that the method reduces the chances of loss or breakage of the stone, and that smaller stones can be more securely mounted. 2 illustr.
G *D 13.3*

SURFACE FINISH TESTING

Check finish smoothness right in the shop

Erie Bolt & Nut Co. *Tooling & Prodn* 1958 Vol 23 (12) p 56 (Mar)

A Brush Surfindicator may be used to check finish smoothness; it can be calibrated to measure surface roughness ranges from 1 to 1,000 micro-inches. Its manually operated pick-up arm contains a 0.0005 in. tip radius conical diamond stylus, which traces the irregularities in the surface of the material being tested. By means of this instrument, the micro-in. finishes specified by customers can be more quickly attained, and overfinishing is prevented. 1 illustr.
A *D 15.4*

Control of instrument for checking the degree of finish of plane surfaces

M. Joannis. *Microtecnic* 1957 Vol 11 (5) pp 211-215; *Index Aeronaut* 1958 Vol 14 (3) p 47 (Mar)

A beam of light is projected on to the surface at an angle of 30° to the normal. The surface is then rotated around the normal axis and the values of light reflected along the normal are measured. The distribution and extent of the reflexion values is related to the surface finish. *X* *D 15.4*

Surface testers for the workshop and the laboratory. Oberflaechenpruefgeraete fuer Werkstatt und Laboratorium

A. Metz. *Maschwelt & Elektrotechnik* 1958 Vol 13 (3/4) pp 50-53 (Feb) (In German)

A survey is given of all the usual types of surface testers. 7 illustr. *H* *D 15.4*

MISCELLANEOUS

Ford discloses new template-making method

Ford Motor Co. *Machinery* (NY) 1958 Vol 64 (5) pp 125-128 (Jan)

The drawing pattern is marked on an 0.0075 in. thick reticle on a Cincinnati Projecto-Form scribing machine. The reticle consists of a 0.0055 in. transparent Mylar base with a 0.002 in. opaque emulsion coating. Scribing is done by a sintered carbide point (30 deg included angle) cutting through the emulsion coating. The scribed lines are 0.004 in. wide. The scriber carriage slides across a vernier. By sliding over a second vernier at 90 deg the scriber is given accurate movement in co-ordinate directions. The circular table is rotated for scribing sloping lines. The angular position is set by a further vernier. The recticle is then mounted on a shadow box, dimensions and arrowheads being scribed manually. To make a template, the reticle and steel blank are positioned on a filing machine manufactured by Optical Gaging Products Inc. The profile is roughed out with a round file, and finished with a square or thin file. Considerable savings are claimed over the old method. 5 illustr, 2 tables. *R* *C 10.0*

Testing machine tool beds

Anon. *SA Mining & Engg Journ* 1958 Vol 69 Pt 1 (3396) p 438 (Mar 14)

At the Hanover Fair an alignment telescope was shown which can be placed directly on the guide ways of the machine tool to be examined. Deviations horizontally and vertically may be determined, and exact angular values measured. An optical level bubble goniometer enables the machine elements to be orientated at any angle, and the instrument can be used on plane or cylindrical work. The instrument has a built-in microscope and a worm drive for fine adjustment. *A* *D 15.2*

Manual operation—to automation

A. Schatz. *Progressus* 1957 Vol 38 (4) pp 73-96 (Sep); (6) pp 145-164 (Dec)

The applicability of automation to a large number of processes is discussed, and a formula is given which enables the calculation of the degree to which automatic operation should be incorporated on a metal cutting machine tool. Trends in the design of modern machine tools are discussed and illustrated. 196 illustr, 1 table. *W* *C 6.0*

PUBLICATIONS RECEIVED

BOOK REVIEWS

Metal Industry Handbook and Directory 1958

Iliffe & Sons Ltd, Dorset House, Stamford St, London, SE 1. 1958, 544 pp, indexes, tables. Price 15s 0d

The Metal Industry Handbook continues to provide a useful guide to all concerned with the general field of metallurgy. It is divided into four main sections covering: general properties; general data and tables, including hardness conversion tables, etc; electro-plating and allied processes; and finally, on green paper, a comprehensive directory including trade names, scientific and technical institutions and associations, and a buyer's guide. *W* *D 14.5*

Mining in Canada

6th Commonwealth Mining and Metallurgical Congress. Authority of the General Committee of the 6th Commonwealth Mining and Metallurgical Congress, Toronto, Canada, 1957. 597 pp, illustr. Price £4 6s 0d

The book was originally produced as a source of information for visitors to the Sixth Commonwealth Mining and Metallurgical Congress, but it also provides an excellent guide to Canadian mining practice, of use to the student and foreign miner.

Operating procedure and results achieved at various mines are described, and all subjects, from shaft sinking to underground haulage, are dealt with at length by experts in the respective fields. A special section, by T. A. O'Hara, is entitled 'Blasthole diamond drilling at Flin Flon'. Diamond drills have been used for blasthole stoping at Flin Flon since 1941, and the author claims that no other stoping method could compete economically in Flin Flon's strong ore, and that no other method of drilling blast holes can compare with diamond drilling in economy, speed, or flexibility. A further section deals with longhole carbide drilling at the mines of the International Nickel Co of Canada, Ltd. The performance of various grades and designs is described, and problems encountered are analysed.

The book is well-produced and clearly illustrated, and is recommended to all whose approach to mining is practical rather than theoretical.

W *C 1.24 : C 9.0 : C 9.21*

TRADE LITERATURE

Firms issuing trade literature connected with the industrial diamond and allied fields are reminded that we would welcome the receipt of such literature for review in this journal. Copies should be sent to the Industrial Diamond Information Bureau, Industrial Distributors (Sales) Ltd, 2 Charterhouse St., London E C I.

Churchill machine tools

Charles Churchill & Co Ltd, Coventry Road, South Yardley, Birmingham. 44 pp, 8½ × 11½ in., illustr

A well-produced and comprehensive catalogue illustrates and describes a selection of machine tools available through the Churchill company. Thirty-four machines appear under the following classifications: Churchill precision grinding machines, Cincinnati milling machines, Peterman Swiss type automatics, Goss and de Leeuw chucking automatics, Churchill-Redman lathes, Churchill gear machines, Conomatic multi-spindle automatics, Vertimax production lathes, Scharmann boring machines, and Supfina superfinishing equipment.

Of particular interest is the Churchill model HBM internal grinder, in which sizing is controlled by the truing diamond in both single and double automatic cycles; the essential difference being that, in double cycle, truing occurs between roughing and finishing stages, whereas in single cycle it occurs just prior to the grinding wheel entering the bore of the work. Also of interest are the Supfina SM 53 superfinishing machine, and the Supfina SE30 and SE40 superfinishing attachments. At the back of the catalogue is a list of companies in the Churchill group, and names and addresses of companies which Churchills represent are provided.

W *C 5.3 : C 6.3 : C 12.3 : C 13.4*

Lap-king precision lapping machine

Byron Jackson Pumps Inc, PO Box 2017A, Terminal Annex, Los Angeles 54, Calif. 4 pp, 8½ × 11 in., illustr

Claimed to be fool-proof, the Lap-King bench-type machine is reputed to produce a lapping accuracy within 0.0000116 in. Consistently optically flat plates are assured as the machine is designed to lap its own 9 in. diameter plates, one against the other.

W *C 13.2*

Cooke microscopes

Cooke Troughton & Simms Ltd, York. 35 pp, 6¾ × 9 in., illustr

A representative selection of the company's microscopes is reviewed, as well as a number of accessories. Of particular interest is the M2990V2 inverted metallurgical microscope, which is offered with binocular and monocular bodies. This model is illuminated by a 6V, 15w bulb, and has an iris with centring adjustment, and provision for inserting filters. A 200/250V variable voltage transformer is included. The coarse and fine motion controls of the instrument are concentric, and a quintuple objective changer is provided. The 'grinding' type stage permits the specimen to be moved with great precision without the aid of any mechanical means.

W *D 15.2*

Machining and fabrication of the rarer metals : tungsten, molybdenum, tantalum, niobium, zirconium

Murex Ltd, (Powder Metallurgy Div), Rainham, Essex. 11 pp, 6¼ × 9½ in., illustr

As a result of their own experiences in machining the rarer metals, Murex have been able to obtain valuable information on the most suitable machining techniques. This booklet deals with 3 of the metals individually, as they have widely varying characteristics, and treats tantalum and niobium under one heading. Tooling recommendations give advice on the most appropriate tooling material, cutting speeds, feeds, and depth of cut to be taken. Tool point angles designed to give the longest lasting cutting edge are illustrated. Screw cutting and drilling advice is presented, and advice is offered on various fabrication processes.

W *C 6.2 : C 12.2*

Stanton's new single pan Ultramatic balances

Stanton Instruments Ltd, 119 Oxford Street, London W 1. 4 pp folder, 9½ × 7½ in., illustr

The Ultramatic range of balances provides complete weight loading up to 200 g, without the use of loose weights. The arrestment gear is fully jewelled, and planes are of optically flat corundum. The instrument's working parts are enclosed in a neat enamel case, and the pan is accessible behind a sliding glass door. Four weight loading dials are arranged in two concentric banks on the left-hand side of the balance case. A counter mechanism is located on the base plate at the front of the balance, and adjacent to this is a ground glass screen on to which an image of the reading is projected. Sensitivities and graticules vary according to the model, as does time for arrestment. The illumination system is insulated against heat radiation to the balance chamber.

W *D 15.81*

SEI sapphire stylus

Salford Electrical Instruments Ltd, Peel Works, Silk Street, Salford 3, Lancs. 4 pp, 8½ × 10½ in., illustr

Variously mounted synthetic sapphire gramophone styli are illustrated. The manufacturers emphazise the need for individual grinding and polishing of the tips. Some further applications of synthetic sapphire are listed, *eg* v-jewels and cup-jewels.

W *C 3.22*

PATENT LISTS

BRITISH

The Official Journal (Patents) 1958 (3607) (Apr 2)

795,667 ABBEY, A. (AMERICAN OPTICAL CO). Optical grinding.

The Official Journal (Patents) 1958 (3608) (Apr 10)

795,955 HOUGHTON, L. N. Radius grinding attachments for milling cutters or the like.

795,935 INDUSTRIES MUSICALES ET ELECTRIQUES PATHE MARCONI. Gramophone pick-up needles.

The Official Journal (Patents) 1958 (3610) (Apr 23)

796,782 TSCHIRF, L., and GAERTNER, F. Hardness testing methods and apparatus therefor.

796,832 CONSOLIDATED DIAMOND TOOL CORPORATION. Cutting disks for cutting hard abrasive material, and the production of such disks.

UNITED STATES

Official Gazette 1958 Vol 728 (1-4) (Mar)

2,825,186 L. J. PALUSCH, L. HARBOR, GULTON INDUSTRIES INC. Ultrasonic drill.

2,825,187 K. L. LINDQUIST, NORTON CO. Lapping machine.

2,825,638 A. C. BOOTH, UNITED STATES RUBBER CO. Grinding wheel manufacture.

2,826,007 W. E. REASER, SUN TOOL & MACHINE CO. Automatic contour edge grinder.

2,826,008 E. R. DUNN, GARDNER MACHINE CO. Locating abrasive wheels for dressing.

2,826,009 R. O. SHURSON, CRANE PACKING CO. Work holder for lapping machines.

2,826,010 C. ROSER, J. HALLER. Precision lapping machine.

2,826,015 W. OSENBERG, BISLERFELD & STOLTING. Rotary grinding wheels.

2,826,016 E. HURST, REXALL DRUG CO. Reinforced abrasive products.

2,826,019 C. L. GARRISON, OLIVER INSTRUMENT CO. Cooling system and apparatus for abrasive wheels.

2,826,188 S. G. BRADY, GEAR GRINDING MACHINE CO. Trimming mechanism for form grinders.

2,826,189 S. KIRZNER, H. A. ALPERN. Dressing tool holder.

2,826,540 G. F. KEELERIC. Method and apparatus for electrolytic cutting, shaping, and grinding.

2,826,872 B. D. ROBBINS, PITTSBURGH PLATE GLASS CO. Apparatus and method for edge grinding of plates.

2,826,873 G. C. RAU, THREADWELL TAP & DIE CO. Machine tool.

2,826,874 E. M. KATZENBERG, ROBINSON-HOUCHIN INC. Automatic lens grinding and polishing machine.

2,826,877 K. LAU, ERNST WINTER & SOHN. Diamond grinding and polishing device.

2,826,878 F. W. LINDBLAD. Grinding wheel.

2,827,037 D. J. WALLACE, L. CATALLO, WHEEL TRUEING TOOL CO. Form dressing assembly.

2,827,038 G. LEFEVRE, MO NA COR. Boring machine adapted more particularly for use in the boring of small hard stones serving for industrial purposes, such as clockwork jewels or draw-plates.

2,827,595 M. BRUMA, M. MAGAT, CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE. Device for machining by means of electric spark pieces made of conducting materials.

2,827,689 M. E. SCHOFFNER, T. L. SCHOFFNER, H. W. BOOZER, R. M. BOOZER. Lapidary tweezer and stand therefor.

2,827,740 L. E. LEE. Polishing treatment for article surfaces.

2,828,197 P. W. BLACKMER jun, NORTON CO. Metal bonded diamond wheels.

SOUTH AFRICAN

Official Journal 1958 Vol 11 (8-11) (Feb-Mar)

Complete Specifications Accepted

Not published separately after No 10, Mar 12. No case.

Extracts of Complete Specifications Accepted

(Combined with Complete Specifications Accepted from No 11, Mar 19, onwards).

478/57 J. J. BALLATO, NORTON CO. Coated abrasive segment and wheel containing the same.

AUSTRALIAN

Official Journal 1958 Vol 28 (4-7) (Feb)

212,360 SANDVIKENS JERNVERKS AB. Rock drill cutting insert.

212,479 MINNESOTA MINING & MFG CO. Abrasive wheel.

212,672 R. T. HOUSTON. Hollow earth drill.

212,734 J. L. PEGLER. Contact grinding wheel.

SWISS

Patentliste 1958 (3-4) (Feb)

327,830 A. THURNHERR, F. MALER. Device for the accurate re-grinding of twist drills.

327,831 F. KUENZLE. Grinding apparatus.

328,159 M. BRUMA, M. MAGAT, CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE. Device for spark machining.

328,173 E. FOUQUET. Method of machining a workpiece by grinding, and device for carrying out this method.

FRENCH

Bulletin Officiel 1958 Vol 75 (3855-58) (Mar-Apr)

1,159,738 C. KLINGSPOR GmbH. Elastic abrasive body.

1,159,893 A. MASSON. Machine for working stone.

1,159,902 CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE. Method and device of the type in which machining takes place by intermittent spark discharge.

1,160,740 J. J. SIGMAN jun, W. S. PRAEG, NATIONAL BROACH & MACHINE CO. Tool for grinding gear wheels.

1,160,812 C. KRUG. Tool for plane polishing.

1,160,962 J. J. BALLATO, NORTON CO. Polishing grinding wheel made of an assembly of abrasive elements.

GERMAN

Patentblatt 1958 Vol 78 (13-15) (Mar-Apr)

Applications Open to Public Inspection

1,026,710 M. OBERSCHNUIR, PAUL PLEIGER MASCHINENFABRIK. Rock drill with flushing tube and rubber sealing rings or the like.

1,027,096 H. HELBIG, R. SIEGEMUND, LICENTIA PATENT-VERWALTUNGS-GmbH. Copying grinding device.

1,027,192 J. F. H. CUSTERS, H. DYER, R. W. DITCHBURN, INDUSTRIAL DISTRIBUTORS (1946) LTD. Method for improving the colour of diamonds.

1,027,608 W. HEUSGEN, GEBR BOEHLER & CO AG. Drilling crown with flushing channels ending in grooves on the exterior surface of the drill.

1,027,883 H. R. MONTGOMERY, DEUTSCHE NORTON-GESELLSCHAFT mbH. Sintered hard metal alloy and method for its manufacture.

1,028,016 E. REIBER, FORTUNA-WERKE SPEZIAL-MASCHINENFABRIK AG. Method for the automatic control of the operations in high precision and finishing work of the surface of *eg* metal workpieces.

THE BUREAU'S LOAN SERVICE

Recently the Industrial Diamond Information Bureau has been compelled to return a number of applications for copies of articles abstracted in this journal owing to insufficient details being given of the item required. The attention of all users of the Loan Service is drawn to the note appearing in each issue asking inquirers to supply adequate information.

We have also received several requests from the USA for copies of articles originally appearing in that country, which we were unable to fulfil since our Loan Service operates only in Great Britain. We advised the firms concerned to approach the magazines direct, a procedure which resulted in some loss of time.

It would be convenient not only for the bureau but for inquirers if these two points could be borne in mind.

1957 IDR REPRINTS

The following articles, which appeared in *Industrial Diamond Review* during 1957, are now available, price 1s—post free, from Industrial Diamond Review, 2 Charterhouse Street, London EC 1 :

I 243—The reclamation of diamond powder from industrial wastes, by J. Abel.

I 244—Faster carbide grinding with metal-bonded diamond wheels, by J. W. Ripple.

I 245—The impact testing of hard metals, by W. Spaeth.

I 246—Production of sinter alumina cutting tools, by F. Singer and S. S. Singer.

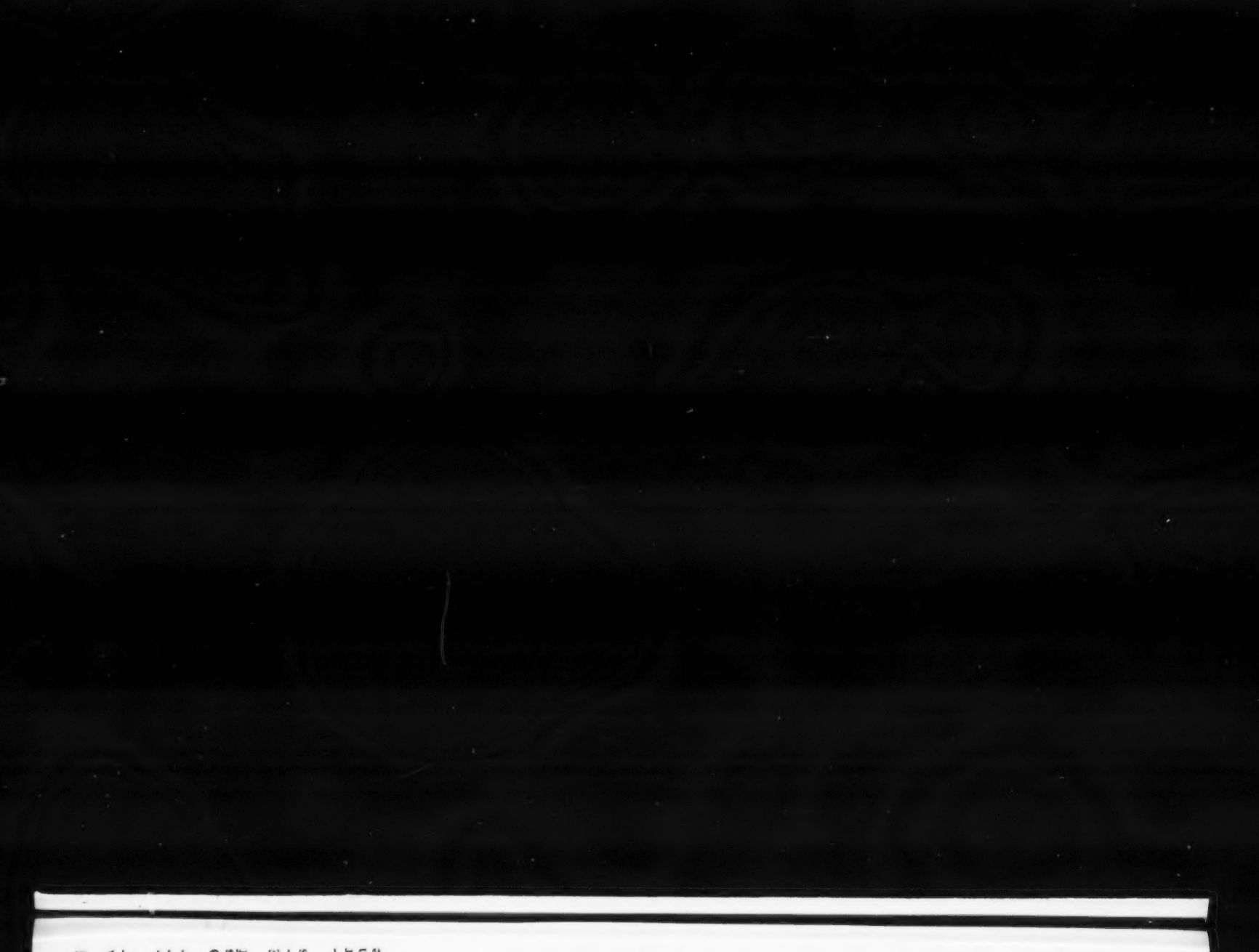
I 247—Mechanized production of instrument jewels, by R. Humphrey and R. E. Leeds.

I 248—The selection of diamonds for industrial purposes, by G. P. Freeman.

I 249—Industrial diamonds from Panna, India, by S. M. Mathur.

TRADE LITERATURE AND BOOKS FOR REVIEW

From time to time, notices appear in *Industrial Diamond Abstracts* inviting manufacturers to submit trade literature for review in this journal. Many manufacturers address such literature to Messrs NAG Press Ltd, and delay is occasioned when this has to be forwarded to our offices. Manufacturers are reminded that the address to which their publications should be sent is :

Industrial Diamond Information Bureau,
2 Charterhouse Street, London EC 1.

Similar delay has been caused by authors and publishers submitting their works for review. Books for review should be sent to the address shown above.